REMARKS

Status Summary

In this Amendment, claims 13 and 21 are canceled, and claims 28-30 are added. Therefore, upon entry of this Amendment, claims 1-12, 14-20, and 22-30 will be pending.

Drawings

The drawings were objected to in the Official Action as failing to include labels for certain elements in Figures 8, 9, and 11. Corrected drawings including the labels for the appropriate elements are attached hereto. Accordingly, the objection to the drawings should now be withdrawn.

Claim Rejections 35 U.S.C. § 103

Claims 1, 9, 11-13, and 19 were rejected as unpatentable over U.S. Patent No. Re. 35,209 to Partyka et al. (hereinafter, "Partyka") in view of U.S. Patent No. 4,829,543 to Borth et al. (hereinafter, "Borth"). This rejection is respectfully traversed.

The present invention, for example, as claimed in amended independent claims 1, 12, and 20, includes a quadrature phase modulation receiver and a method for demodulating a received signal in which the influence of data changes in the modulating signal are removed by multiplying the frequency of the intermediate frequency signal by a fixed multiplication factor. As stated in the specification of the present application, one problem with demodulating spread spectrum signals is that the BPSK signal phase changes based on the transmitted information. As a result, control signals output from

synchronization circuits and a receiver also vary with the transmitted information. Since the control signal phase changes, synchronization between the oscillators and the transmitter and the receiver cannot be reliably achieved. (See page 8, lines 1-10 of the present specification.)

In order to avoid this difficulty, the present invention multiplies the frequency of a signal that is mixed with the received signal by a predetermined fixed multiplication factor. As derived in Equations 1-7 in the present specification, the influence of the modulating signal is removed from the signal that is mixed with the input signal. As a result, the frequency multiplied signal can be used to demodulate the received signal with the reduced likelihood of losing synchronization with the received signal. (See page 21, lines 3-9 of the present specification.) Independent claims 1, 12, and 20 have been amended to emphasize that the intermediate frequency signal is multiplied by a predetermined fixed multiplication factor and that the resulting signal does not depend on the phase of the modulating signal.

There is no disclosure in Partyka or Borth of producing an oscillator control signal by multiplying the frequency of the intermediate frequency signal by a fixed multiplication factor that removes the influence of phase changes in the modulation signal. According to Partyka in a spread spectrum receiver, a microprocessor scans through all code phases and determines the de-spreading code phase that produces that the greatest carrier power. For example, Partyka states:

> In a preferred embodiment of the receiver, the microprocessor **570** first scans all possible code phases and determines the corresponding carrier powers. The carrier power is determined through the receiver signal strength indicator which produces a signal indicative of carrier power. ... The microprocessor then changes the phase of the generated PN sequence by one chip and repeats the process. The process is repeated

> for all possible sequence phases (equal to the number of chips per sequence). The microprocessor then chooses the phase corresponding to the strongest carrier power. (See column 11, lines 7-26 of Partyka.)

From these passages, rather than teaching multiplying the frequency of the intermediate frequency signal by a predetermined fixed multiplication factor, Partyka teaches that a microprocessor scans through possible carrier phases in order to determine the best phase of the signal to be mixed with the input signal. There is no disclosure of multiplying the signal, not to mention multiplying the signal by a fixed multiplication factor. Moreover, the fact that Partyka indicates that different phases are scanned for each received signal teaches away from multiplying the frequency of the intermediate frequency signal by a fixed multiplication factor.

Borth likewise fails to teach or even remotely suggest multiplying the phase of a signal that is mixed with the input signal by a predetermined fixed multiplication factor and removing the influence of the modulating signal from that signal. As indicated in the Official Action, Borth teaches methods and systems for modulating and demodulating TDMA radio signals. Thus, for this reason alone, it is respectfully submitted that Borth is irrelevant to the claimed invention, which relates to spread spectrum communications.

Moreover, Borth fails to teach demodulating a received spread spectrum signal using an intermediate frequency signal whose frequency is multiplied by a fixed multiplication factor and influence of data changes in the received signal are removed. Borth is directed to using QPSK to increase the throughput of a TDMA channel and is simply not relevant to the invention. Thus, for these reasons, it is respectfully submitted that the rejection of claims 1, 9, 11-13, and 19 as unpatentable over Partyka in view of Borth should now be withdrawn.

Claims 5 and 6 were rejected under 35 U.S.C. § 103(a) as unpatentable over Partyka in view of Borth and further in view of U.S. Patent No. 5,537,448 to Schwarz et al. (hereinafter, "Schwarz"). This rejection is respectfully traversed.

Claims 5 and 6 depend from claim 1. As stated above with regard to the rejection of claim 1 as unpatentable over Partyka in view of Borth, these references fail to teach or even remotely suggest demodulating a received spread spectrum signal using an intermediate frequency signal whose frequency is multiplied by a predetermined fixed multiplication factor and in which influences of data changes in the received signal are removed. Schwarz likewise fails to teach such a receiver or method. Schwarz is directed to a switchable PLL circuit. The fact that Schwarz teaches a voltage controlled oscillator as a component of a PLL circuit fails to teach or suggest the method for demodulating a received spread spectrum signal using a frequency multiplied version of an intermediate frequency signal in which the influence of data changes are removed. Accordingly, it is respectfully submitted that the rejection of claims 5 and 6 as unpatentable over Partyka in view of Borth and further in view of Schwarz should now be withdrawn.

Claims 10, 18, 20-21, 26, and 27 were rejected under 35 U.S.C. § 103(a) as unpatentable over Partyka in view of Borth and further in view of U.S. Patent No. 5,048,057 to Saleh et al. (hereinafter, "Saleh"). This rejection is respectfully traversed.

Claim 10 depends from claim 9, which depends from claim 1. Claim 18 depends from claim 12. Claim 20 is independent and has been amended to include processing steps similar to those in claim 12 of multiplying the frequency of the intermediate frequency signal by a predetermined fixed multiplication factor that removes influences

of data changes in the received signal. Claims 21 and 26-27 depend either directly or indirectly from claim 20.

As stated above with regard to the rejection of the claims as unpatentable over Partyka in view of Borth, neither of these references, when taken alone or when combined, teaches a method for removing the influence of data changes from an intermediate frequency signal by multiplying the frequency of the intermediate frequency signal by a fixed multiplication factor. Saleh likewise fails to teach such an invention. Saleh teaches a wireless local area network that uses frequency hopping. According to Saleh, a transmitted signal is modified so that interference can be more easily detected and removed from the received signal. There is absolutely no teaching or suggestion in Saleh of multiplying the frequency of the intermediate frequency signal by a fixed multiplication factor so that the influence of data changes of the transmitted signal on the received signal are removed. Accordingly, it is respectfully submitted that the rejection of claims 10, 18, 20, 21, 26, and 27 as unpatentable over Partyka in view of Borth and further in view of Saleh should now be withdrawn.

Allowable Subject Matter

Claims 2-4, 7, 8, 14-17, and 22-25 were objected to as being dependent upon a rejected base claim. Claim 2 has been rewritten in independent form to include all of the limitations of claim 1. Claim 3 has also been rewritten in independent form to include all of the limitations of claim 1. Claim 4 depends from claim 3. Claim 7 depends from claim 2, and claim 8 depends from claim 7. Accordingly, it is respectfully submitted that claims 2-4, 7, and 8 should now be allowed.

Claim 14 has been rewritten in independent form to include all of the limitations of claims 12 and 13. Claims 15-17 depend from claim 14. Accordingly, it is respectfully submitted that claims 14-17 should now be allowed.

Claim 22 has been rewritten in independent form to include all of the limitations of claims 20 and 21. Claims 23-25 depend from claim 22. Accordingly, it is respectfully submitted that claims 22-25 should now be allowed.

New Dependent Claims

New dependent claims 28-30 have been added. Support for claims 28-30 appears, for example, on page 7 at line 2 of the present specification.

CONCLUSION

If any small matter should remain outstanding after the Patent Examiner has had an opportunity to review the above Remarks, the Patent Examiner is respectfully requested to telephone the undersigned patent attorney in order to resolve these matters and avoid the issuance of another Official Action.

The Commissioner is hereby authorized to charge any fees associated with the filing of this correspondence to Deposit Account No. **50-0426**.

Respectfully submitted,

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Enclosure